

# Workforce Issues of the 21st Century: The People CMM to the Rescue

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Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE <b>JUL 2008</b>		2. REPORT TYPE		3. DATES COVERED <b>00-00-2008 to 00-00-2008</b>	
4. TITLE AND SUBTITLE <b>Workforce Issues of the 21st Century: The People CMM to the Rescue</b>				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) <b>Carnegie Mellon University ,Software Engineering Institute (SEI),Pittsburgh,PA,15213</b>				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT <b>Approved for public release; distribution unlimited</b>					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT <b>Same as Report (SAR)</b>	18. NUMBER OF PAGES <b>37</b>	19a. NAME OF RESPONSIBLE PERSON
a. REPORT <b>unclassified</b>	b. ABSTRACT <b>unclassified</b>	c. THIS PAGE <b>unclassified</b>			

# Agenda

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1. Workforce Issues of the 21<sup>st</sup> Century
2. Workforce Issues Impacting Performance and Retention
3. Overview of the People CMM



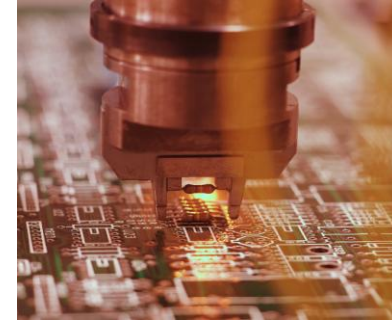
# Workforce Issues of the 21<sup>st</sup> Century



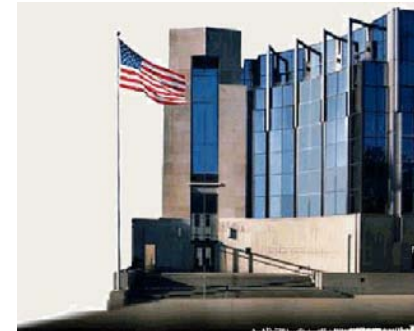
# Putting People Back Into the Equation

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Today, organizations are largely dependent on high-technology to develop, build, and maintain their products and services.

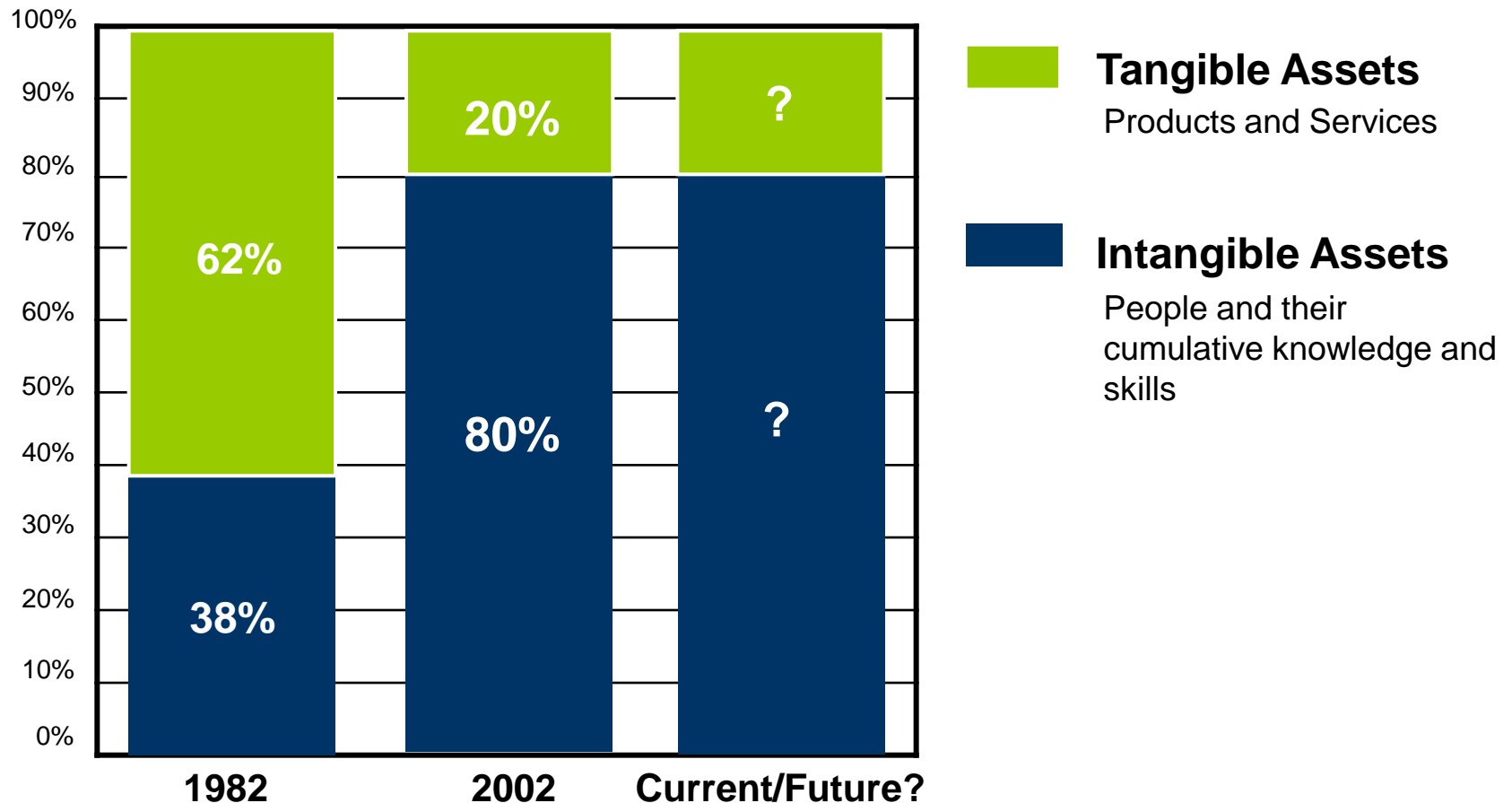


This has created a dependence on a workforce with specialized knowledge and skills.



# People: Growing Contributors to Organization Success

## Organizational Value: Tangible and Intangible



Source: Kirchoff 2006



# Workforce Issues: Worldwide Trends

## Shifting Demographics

United States, European Union, Japan...



## Shortage of knowledgeable, skilled, and adaptable workforce

United States, European Union, Mexico, South Africa, China...

## Work-life balance

United States, European Union, China



## Retention

United States, European Union, China, India



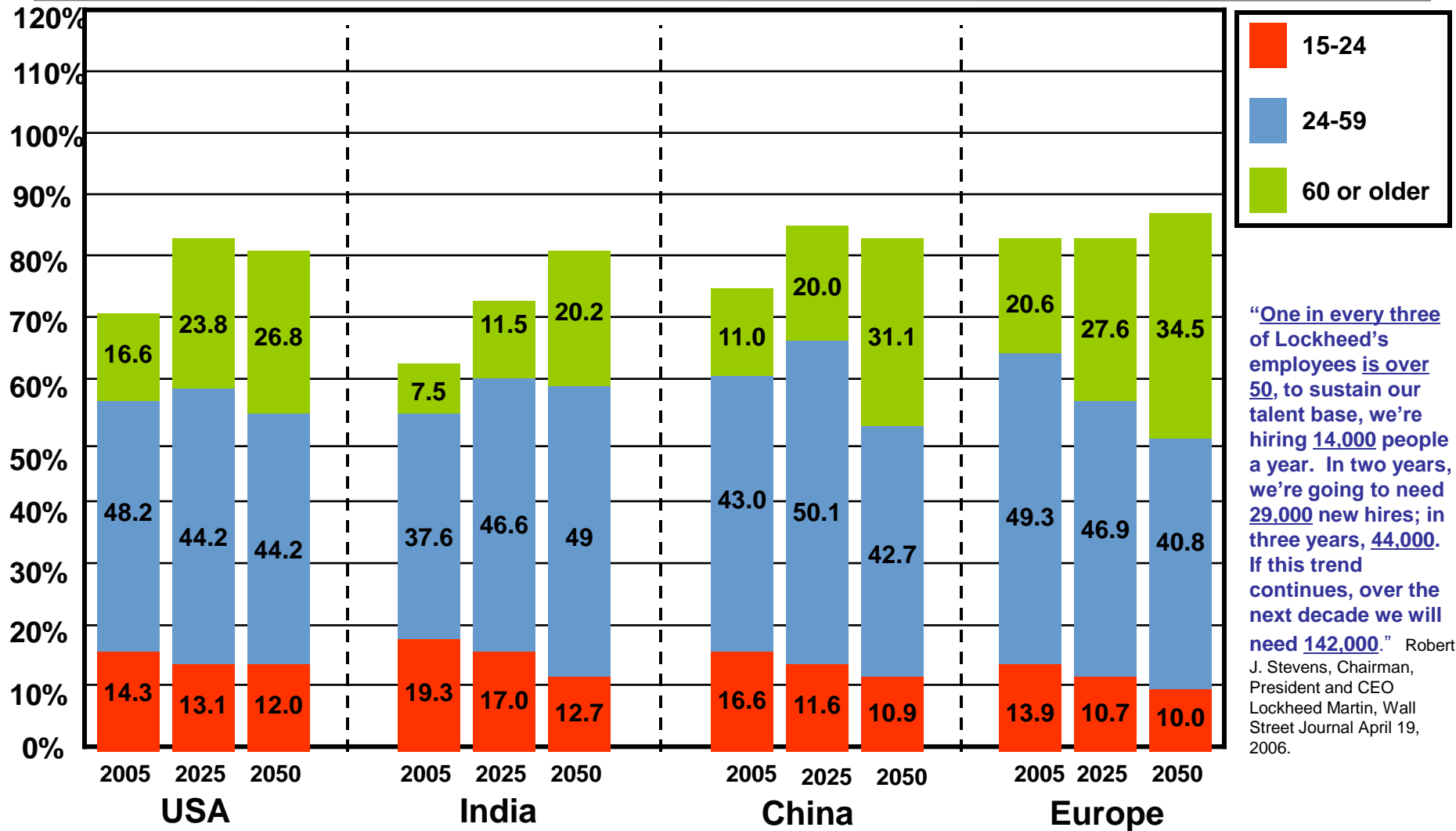
## Multiple generations in the workforce

United States, European Union, China



# Trends Affecting the Workforce

## Shifting Demographics of the World's Population



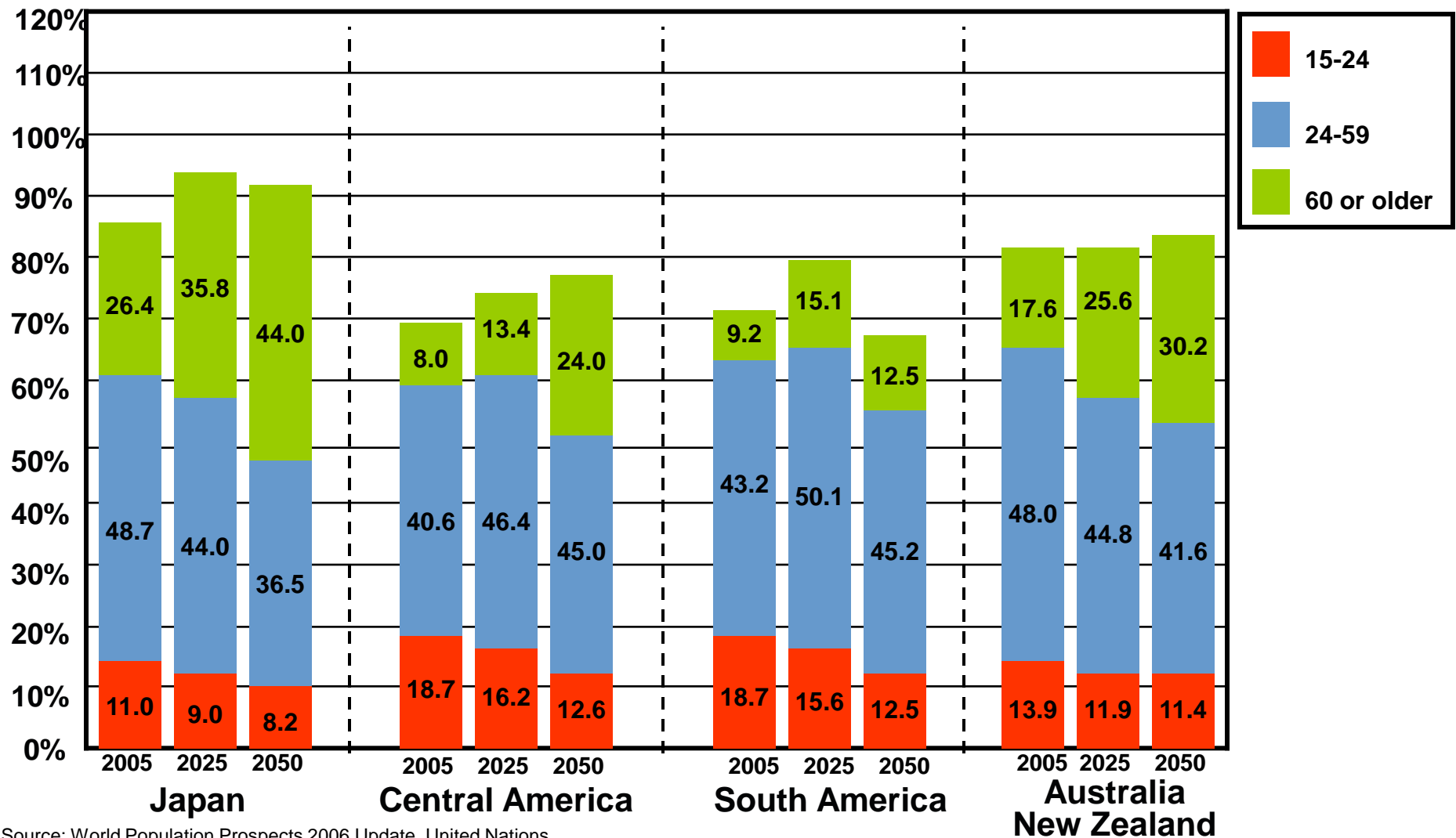
**“One in every three of Lockheed’s employees is over 50, to sustain our talent base, we’re hiring 14,000 people a year. In two years, we’re going to need 29,000 new hires; in three years, 44,000. If this trend continues, over the next decade we will need 142,000.”** Robert J. Stevens, Chairman, President and CEO Lockheed Martin, Wall Street Journal April 19, 2006.





# Trends Affecting the Workforce

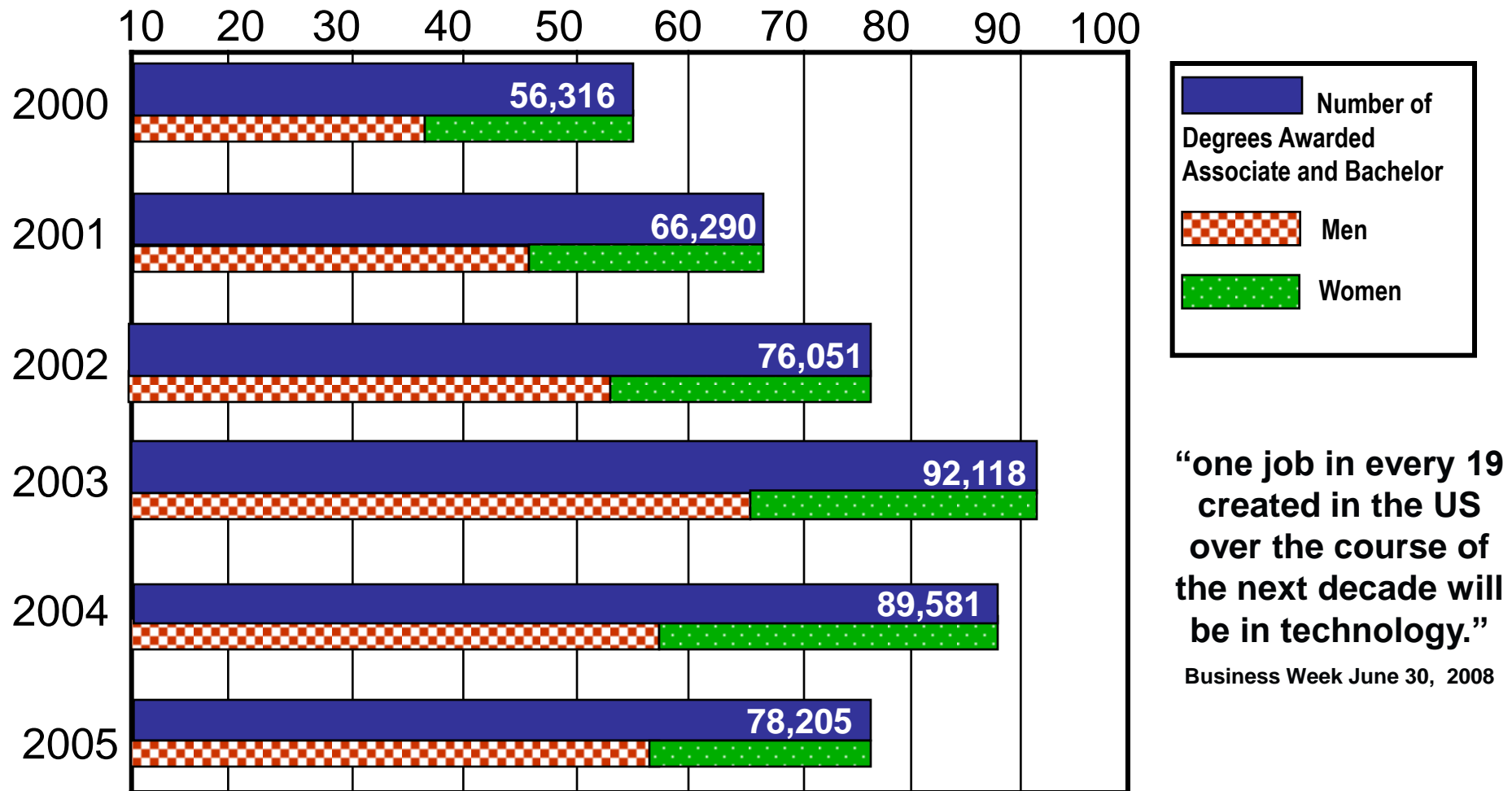
## Shifting Demographics of the World's Population II



Source: World Population Prospects 2006 Update, United Nations



# US Computer Sciences Degrees Awarded 1999 - 2005



Source: National Science Foundation Statistics May 2008



# Shift in Demographics: US Baby Boomers

In the US, between 2010 and 2030 over **78 million baby-boomers**, many in key positions, will be eligible for retirement. With the exit of a large segment of the workforce, many organizations may be facing a loss of:

## Senior Management

- corporate knowledge (“know-how”, soft knowledge, etc.)
- customer and product/services intimacy
- technical knowledge and skills
- mentor



## Senior Technical Staff

- technical knowledge and skills
- product and/or service development knowledge
- corporate knowledge (“know-how”, soft knowledge, etc.)
- mentor



## Senior Administrative Staff

- corporate knowledge (“know-how”, soft knowledge, etc.)
- mentor

and a shift or change in: **Corporate Culture**



# National, DoD, and Civilian AT&L Workforce

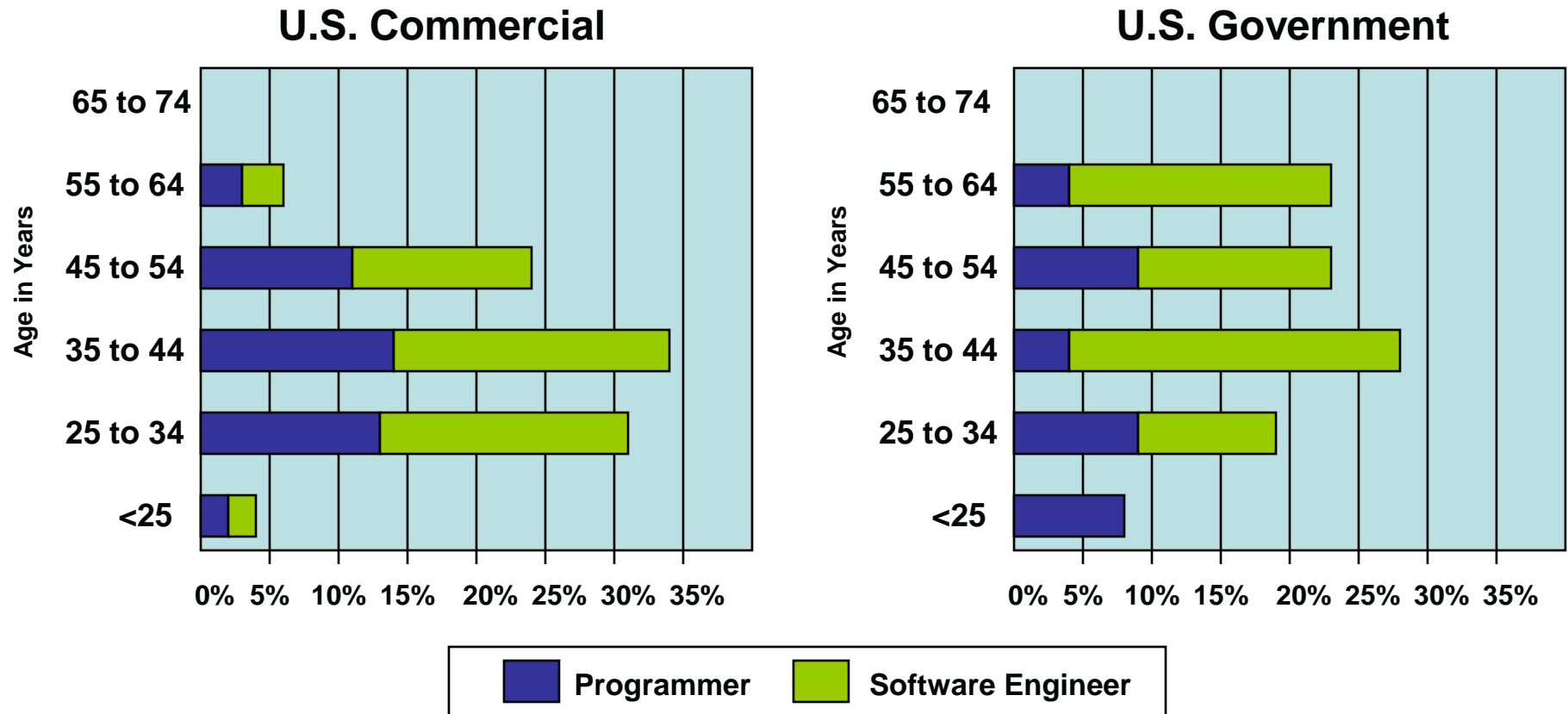
“DoD faces significant challenges related to mitigating the pending departure of its highly experienced and seasoned talent – the critical challenge” Frank Anderson, Jr., Director, AT&L Human Capital Initiatives, President, Defense Acquisition University 2007

	National (2005)		DoD (2006)		Civilian AT&L Workforce (2006)	
Generation	Workforce (Millions)	% Workforce	Workforce	% Workforce	Workforce	% Workforce
<b>Traditionalists</b> (Born before 1946)	11.5	7.5%	45,625	6.7%	8,322	7.4%
<b>Baby Boomers</b> (1946 - 1964)	61.5	42.0%	438,971	64.5%	77,779	68.7%
<b>Generation X</b> (1965-1976)	43.5	29.5%	132,948	19.5%	17,581	15.5%
<b>Generation Y</b> (1977 -1989)	31.5	21.0%	62,676	9.2%	9,394	8.3%
<b>Millennium</b> (1990 - present)	51.0	0%	153	0%	0	0%

Source: Anderson 2007, NDIA STEM Initiative Strategy Session



# Focus on the Software Developer: Age Distribution



Slide adapted from CSIS 2006, Source: Current Population Survey (August 2006)



# Workforce Issues: What Does This Mean to You?

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**Shortage of workers can place undue pressure on existing workforce, longer hours, etc.,**

- reduces productivity and increases defects
- reduces morale and organizational loyalty



## **Knowledge and skills gap**

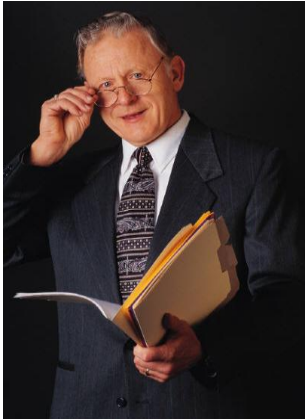
- college graduates
- need to establish or invest in training and development activities
- need to invest in knowledge and skill profiles and assess current capability (competencies)

**Place a strain on Human Resources, hiring managers, and/or recruiters**

- competition for experienced/skilled managers
- intense competition for skilled and knowledgeable workforce
- Federal Sector: Clearance, Clearance, Clearance



# Managing Multiple Generations: Cultural Differences



**Traditionalist**  
**1928-1945**

- Hard worker
- Respects authority
- Work is an obligation
- Communicates formally & in person
- Organizational loyalty
- Work & family don't mix



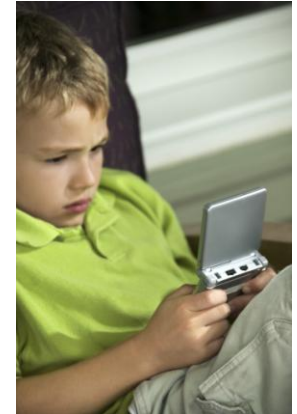
**Baby-Boomer**  
**1946 - 1964**

- Workaholic
- Questions authority
- Works efficiently
- Competitive
- No news is good news
- Work to live, little balance between work/family



**Generation X**  
**1965 - 1980**

- Technically savvy
- Prefer informality
- Learns quickly
- Communicates directly & immediately
- Wants structure & direction
- Seek work/life balance



**Generation Y**  
**1980 - 2000**

- Prefer informality
- Learn quickly
- Embrace diversity
- Requires supervision
- Indirect communication: email & texting
- Seek "demand" work/life balance

# Workforce Issues Impacting Performance and Retention





# Workforce Issues: Performance & Retention

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## Managers

- limited skills/abilities to manage and develop people

## Staffing

- hired for a job without the required knowledge and skills
- job hired is different than job assigned



## Training and Development

- training is not keeping up with changes in technology
- training to reduce knowledge and skills gaps is not provided, timely, or relevant
- limited/no opportunities to develop and use new knowledge and skills (growth)

## Performance Management

- no clear performance objectives, no linkage to committed work
- performance problems are not managed
- inconsistent rewarding of performance



# Workforce Issues: Performance & Retention II

## Communication

- limited/no communication, top down, bottom up, and laterally
- inconsistent and vague messages (verbal and behavioral)



## Compensation

- not linked to performance objectives
- rewards for inappropriate behaviors
- inequity issues



## Work Environment

- physical space and resources to perform committed work are not provided or not provided in a timely manner



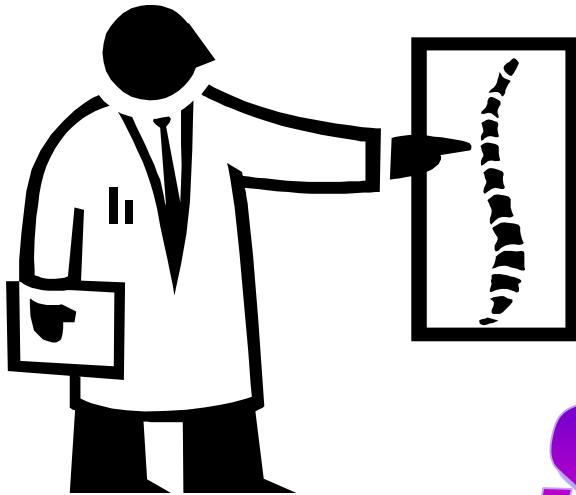
## Organizational Culture

- gap between Ideal and Real Culture
- culture does not support business objectives or mission goals



# Misaligned Workforce Practices

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Communication

Training &  
Development

Staffing

Performance Management

Organizational Culture

Compensation



# The People Capability Maturity Model: Overview

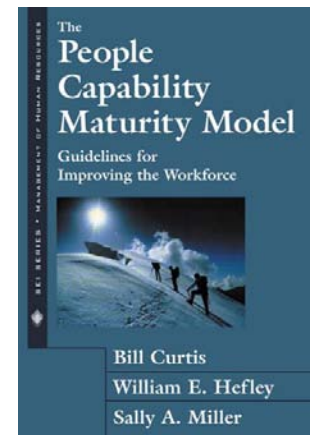


# People CMM: Introduction

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The People CMM is a roadmap for implementing workforce practices that continuously improve the capability of an organization's workforce. It enables organizations to:

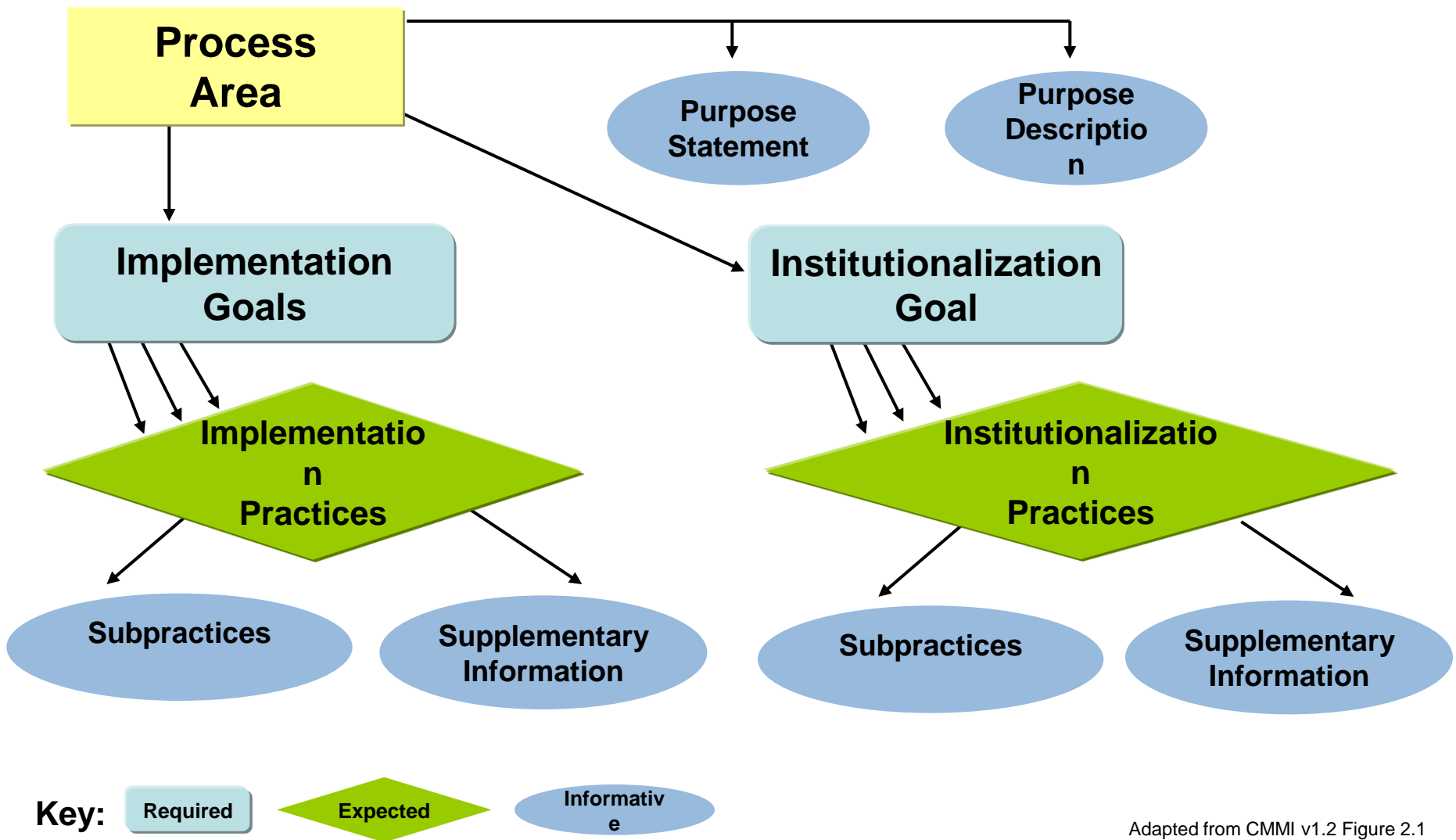
- to attract, develop, organize, motivate, and retain the workforce required to build their products and deliver the services
- align workforce development with strategic business or mission goals
- characterize maturity of workforce practices
- set priorities for improving workforce capability
- become an employer of choice



Curtis, Hefley, & Miller (2001)



# People CMM Model Components



Adapted from CMMI v1.2 Figure 2.1



# People CMM: Process Areas by Maturity Level

Level	Focus	Process Area	Competency Productivity
5 Optimizing	<i>Continuous Improvement</i>	Continuous Workforce Innovation Organizational Performance Alignment Continuous Capability Improvement	
4 Predictable	<i>Predicting Capability &amp; Performance</i>	Mentoring Organizational Capability Management Quantitative Performance Management Competency-Based Assets Empowered Workgroups Competency Integration	
3 Defined	<i>Organizational Competency framework</i>	Participatory Culture Workgroup Development Competency-Based Practices Career Development Competency Development Workforce Planning Competency Analysis	
2 Managed	<i>Basic Management Practices</i>	Compensation Training and Development Performance Management Work Environment Communication and Coordination Staffing	
1 Initial			Risk Turnover



# People CMM Practices: “What, not How”

Practices describe “what” activities and actions should be performed. It is up to the organization to decide “how” the practices are implemented to satisfy goals.



## Two Types of Practices: “The What”

### Implementation

Describe the activities or procedures that should be performed by individuals, in workgroups or units, or by the organization.

### Institutionalization

Practices that help to institutionalize the implementation practices in the organization’s culture so they are effective, repeatable, and lasting.





# People CMM: Institutionalization Practices

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**Practice performance will decay if not institutionalized**

**If no commitment**

**Failed efforts**

**If no ability**

**Ineffective performance**

**If no measurement**

**No improvement**

**If no verification**

**Declining compliance**



# People Capability Maturity Model: Primary Objective

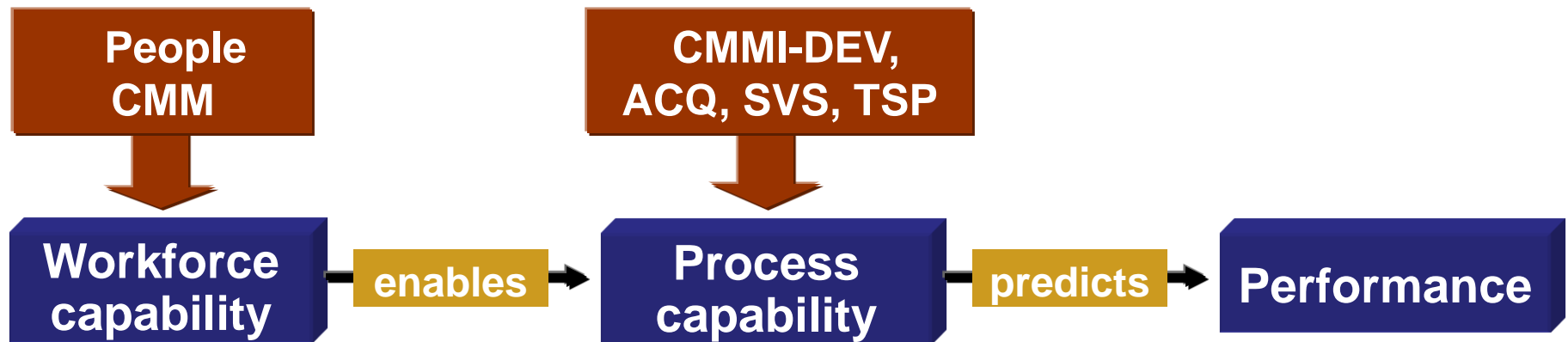
The primary objective of:

a **CMM** is to improve the **capability** of an organization.

the **CMMI (DEV, ACQ, SVS)**, is to improve the **capability** of an organizations processes.

the **People CMM** is to improve the **capability** of an organization's workforce.

The People CMM, defines **capability** as the level of **knowledge**, **skills**, and **process abilities** available within each workforce competency of the organization to build its products or deliver its services.



# Defining Workforce Competency



**Knowledge** represents the comprehension acquired by experience and or study.



**Skills** represents the proficiency or ability in techniques or tools that an individual must be able to demonstrate.



**Process abilities** is the capacity to perform individual skills in the sequencing or method used in the organization.

**Knowledge**

+

**Skills**

+

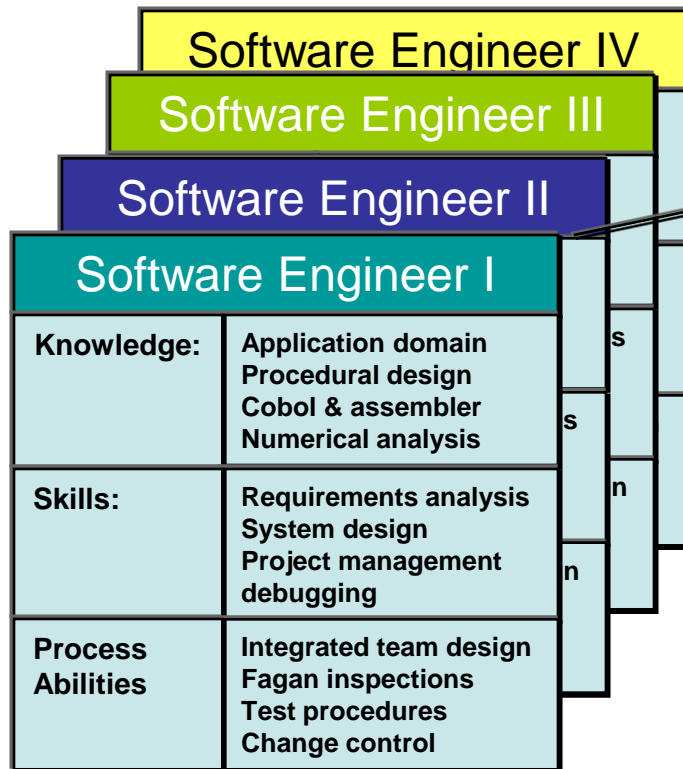
**Process  
abilities**

=

**Workforce  
Competency**



# Workforce Competency Example: Software Engineering



Current Resource Profile (initial inventory)

Workforce Competency	Staffing by Capability Level			
	I	II	III	IV
Software Engineer	17	25	12	5
User Training	2	8	4	1

Current Workforce Needs (one year cycle)

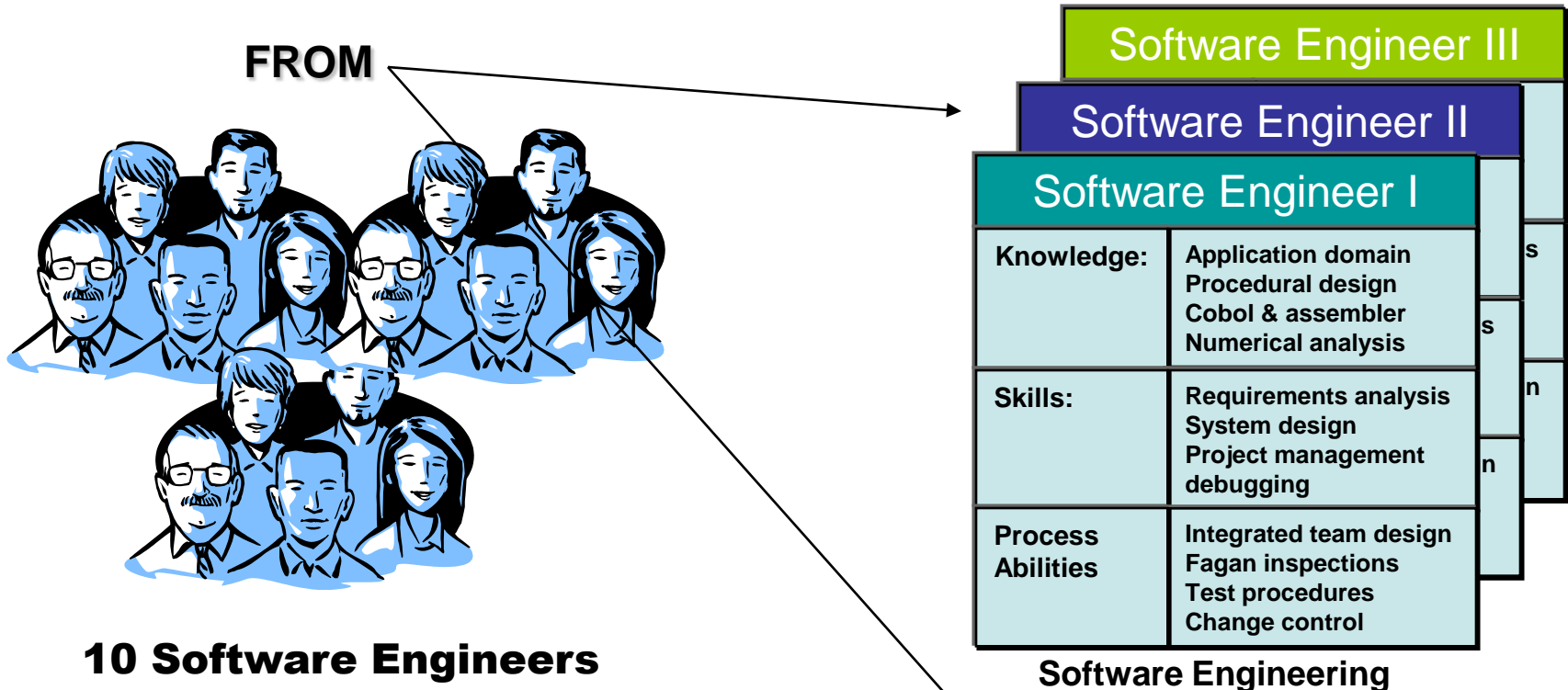
Workforce Competency	Current Staffing Level Needed			
	I	II	III	IV
Software Engineer	23	30	15	7
User Training	4	9	6	2

Strategic Workforce Needs (two to five year)

Workforce Competency	2010 Staffing Level Needed			
	I	II	III	IV
Software Engineer	31	35	18	9
User Training	4	10	8	3



# From Counting Heads to Understanding Capability



**10 Software Engineers**

**5 System Engineers**

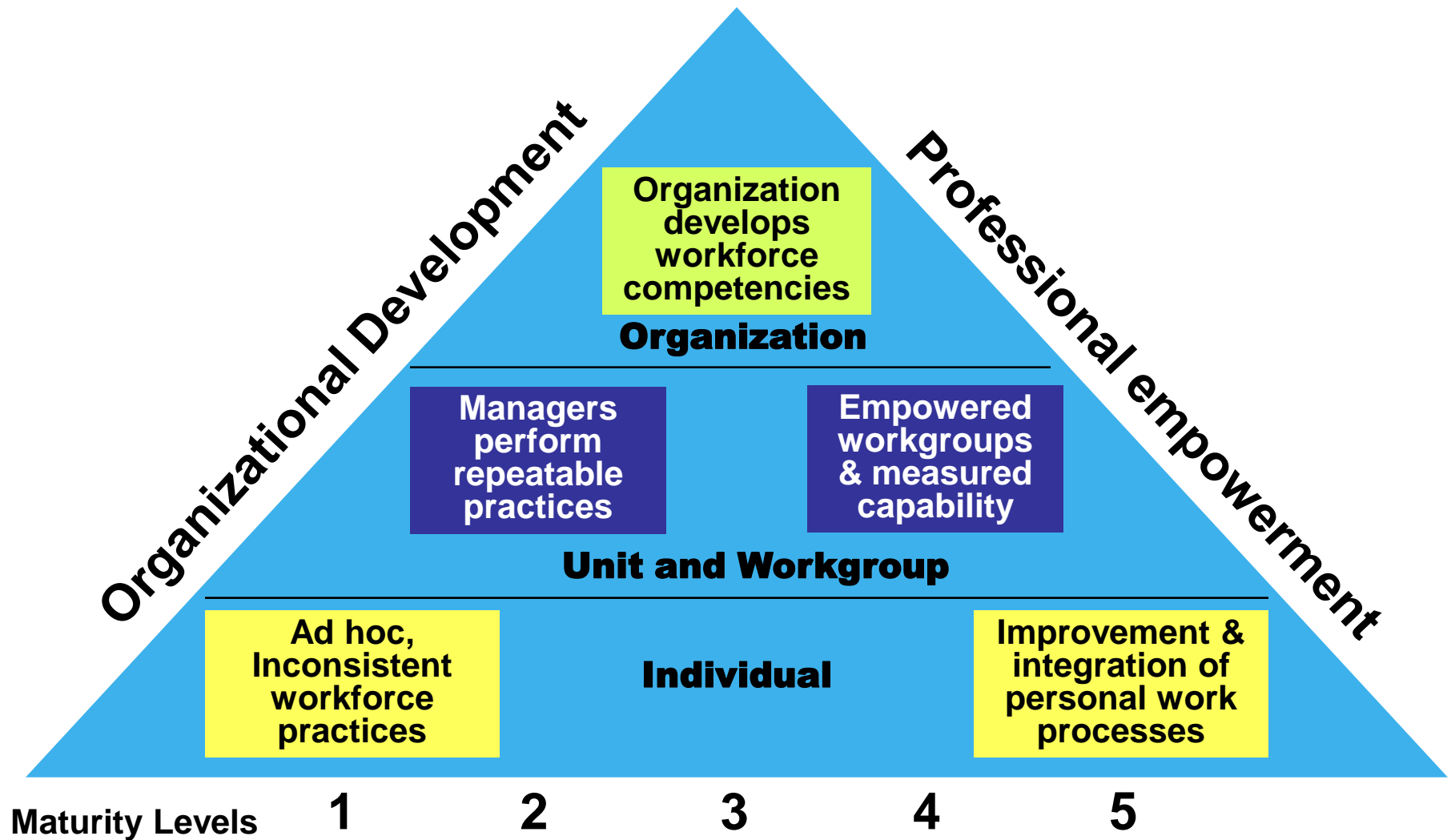
**4 Business Analysts**

## Resource Profile

Workforce Competency	Staffing by Capability Level			
	I	II	III	IV
Software Engineer	17	25	12	5
User Training	2	8	4	1

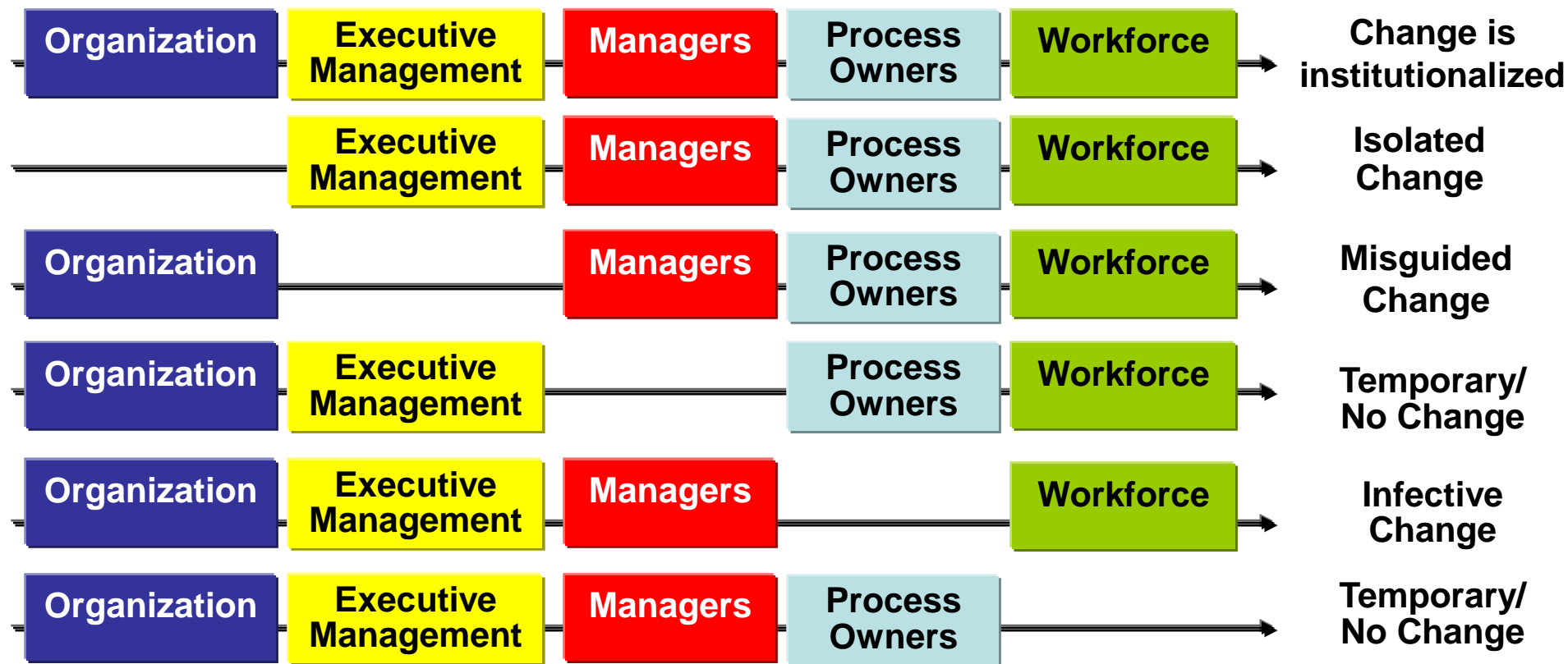


# People CMM: Focus for Changing Practices



# Multiple Roles in the People CMM

While change might be initiated by a single source, it must be accepted, internalized, and institutionalized by all affected parties to become effective and lasting. Practices in the People CMM address this issue.



# Organizational Culture: People CMM Transformations

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## Level 1

Chaotic and an impediment to lasting change

## Level 2

Change occurs due to management and workforce buy-in of committed work

## Level 3

Common understanding of culture; reflects professionalism and information sharing

## Level 4

Supports results oriented performance and quality

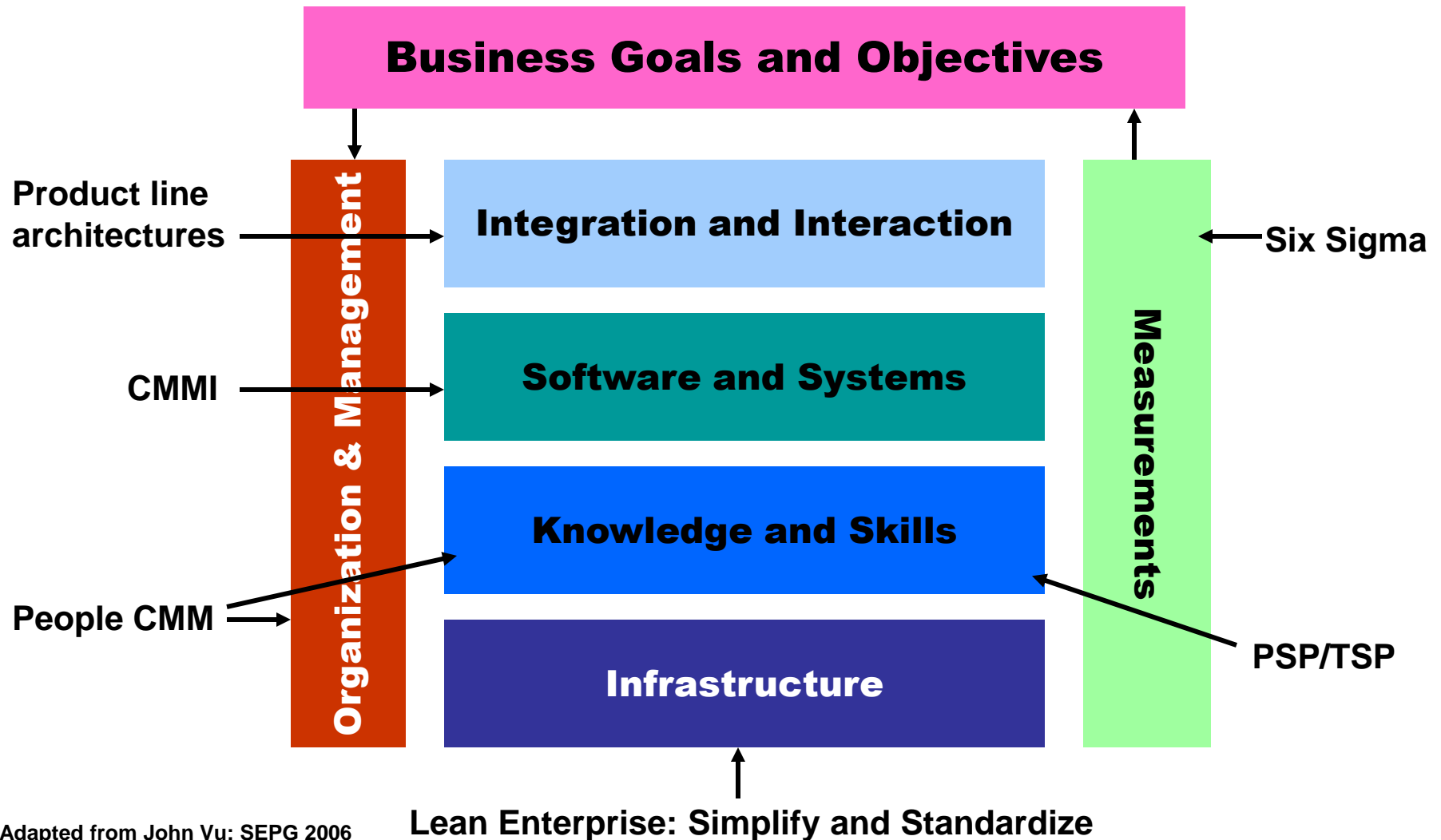
## Level 5

adaptable to changes in business conditions

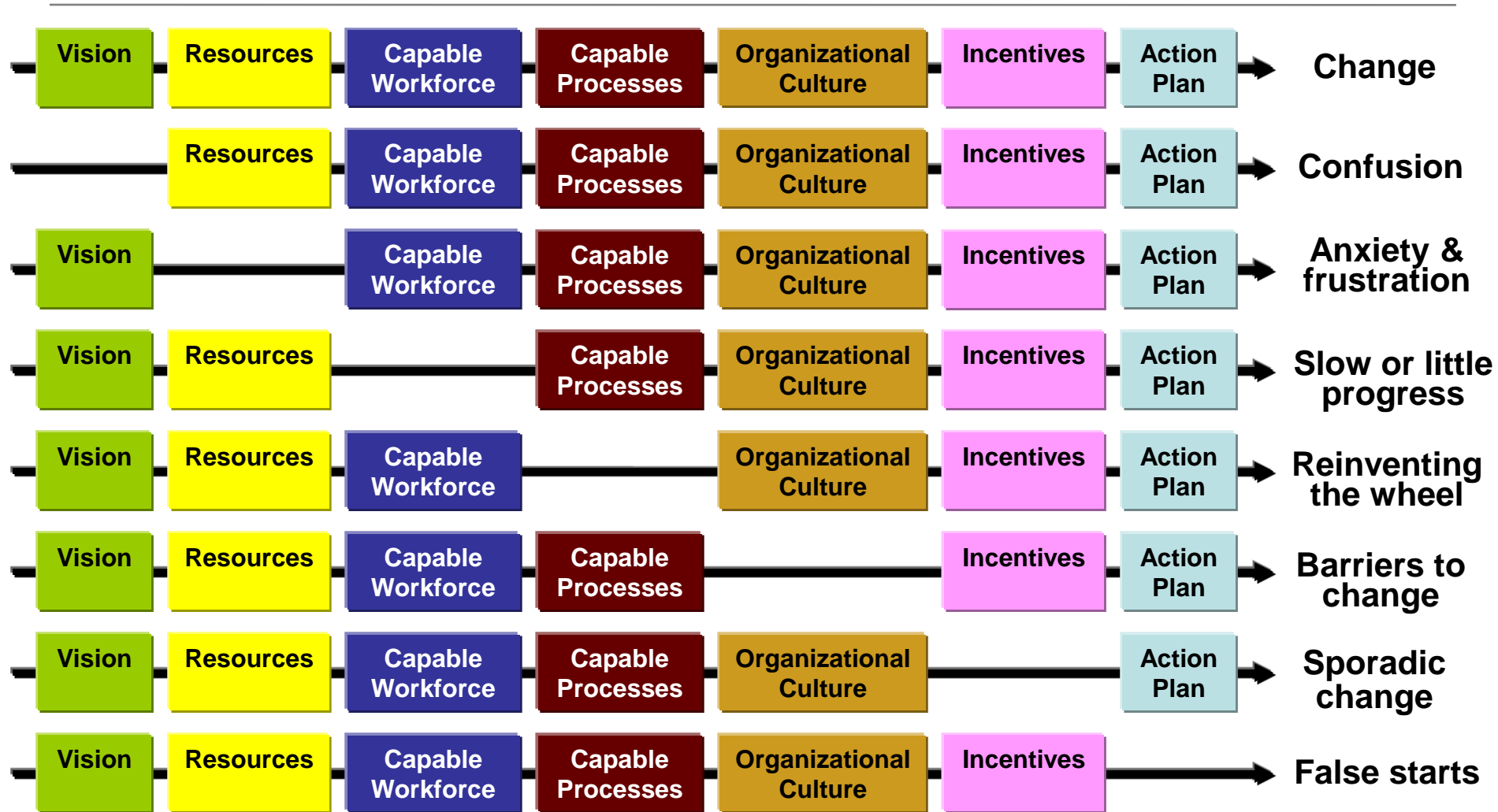




# Multiple Models/Technologies Architectures



# Improvement Efforts: Missing Elements for Change



Adapted from: Delorise Ambrose, 1987. Personal communication.

# People CMM Courses

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## Introduction to People CMM

August 6 – 8, 2008, Washington DC

October 22 – 24, 2008 – Vancouver, Washington  
(week prior to CMMI workshop)

November 2008 (date to be determined) Argentina

December 8 – 10, 2008 - Pittsburgh, PA

## Intermediate Concepts of People CMM

September 8 - 12, 2008 – Frankfurt, Germany

## SCAMPI with People CMM Lead Appraiser Training

November 3 – 7, 2008 – Pittsburgh, PA

## SCAMPI with People CMM Upgrade Training

Week of October 27, 2008 – Vancouver, Washington



# Contacting the SEI

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## Presenters

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# Bibliography

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Anderson, Frank J. 2007. *NDIA STEM Initiative Strategy Session*.

Curtis, Bill, William E. Hefley, and Sally A. Miller. 2001. *The People Capability Maturity Model: Guidelines for Improving the Workforce*. SEI Series, Management of Human Resources. Addison Wesley.

Department of Defense, Acquisition, Technology and Logistics, AT&L Human Capital Strategic Plan, v1.0, September 2006.

Dychtwald, Ken, Tamara J. Erickson, Robert Morison. 2006. *Workforce Crisis: How to Beat the Coming Shortage of Skills and Talent*. Harvard Business School Press.

Employment Policy Foundation. 2002 , *The Seventh-Annual Workplace Report, Challenges Facing the American Workplace, Summary of Findings*.

Hammill, Greg. 2005. *Mixing and Managing Four Generations of Employees*. FDU Magazine online, Winter/Spring 2005. <http://www.fdu.edu/newspubs/magazine/05ws/generations.htm>

Kirchoff, John 2006. *Why Performance Management Improves Human Capital ROI*. SHRM Research.

Kleyman, Paul. 2006. Boomers to Redefine Workplace. In: *Aging Today: The bimonthly newspaper of the American Society on aging*, Vol. 25.No.26

SHRM 2003. Older Worker Survey. [www.shrm.com](http://www.shrm.com)

Toossi, Mitra. 2005. *Monthly Labor Review, November 2005*. Labor Force Projections to 2014: Retiring Boomers. US Department of Labor Bureau of Labor Statistics 2005.

Humphrey, Watts S. 1989. *Managing the Software Process*. Reading, MA. Addison-Wesley.





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